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**DESIGNATION OF THE INVENTOR(S) Page No. . 1 . / . 1**  
(if the applicant is not the inventor or the sole inventor)

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<b>NATIONAL REGISTRATION NO.</b>		02/16,437	
<b>TITLE OF THE INVENTION</b> (200 characters or spaces maximum)  Nail varnish composition comprising a block polymer			
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A subject matter of the present invention is a nail varnish comprising a block polymer. Another subject matter of the invention is a method for making up or caring for the nails.

5

The nail varnish composition can be employed as varnish base or basecoat, as product for making up the nails, as finishing composition, also known as topcoat, to be applied to the product for making up the nails, or also  
10 as product for the cosmetic care of the nails. These compositions can be applied to human nails or also to false nails.

Compositions to be applied, for example, to the nail,  
15 of nail varnish or nail care base type in a solvent medium, conventionally comprising at least one film-forming polymer, optionally a plasticizing agent, pigments, rheological agents and solvents, are known.

20 Currently, nitrocellulose still remains the main film-forming agent most widely used in solvent-based nail varnishes in formulations having optimized gloss and optimized hold.

The formulations comprising nitrocelluloses make it  
25 possible to obtain films with a correct level of hardness and a correct level of gloss but which lack adhesion to the nail.

This disadvantage can be overcome by adding plasticizers but, in this case, it is necessary to use  
30 very large amounts of plasticizers and of coresins, of the order of those of the nitrocellulose.

Moreover, the presence of plasticizers in these formulations is reflected, after film formation and drying, by a change in the properties of the film over  
35 time due both to slow evaporation of the residual solvents present in the film after drying and to potential loss of a portion of the plasticizers, in particular by evaporation, resulting in a hardening of

the film over time and poor resistance of the film to flaking.

5 Research studies carried out in order to replace nitrocellulose with other film-forming agents, such as polyacrylics and polyurethanes, in nail varnishes, such as, for example, the aqueous dispersions of polyurethanes described in the document EP 0 648 485, have not given satisfactory results, in particular in  
10 terms of hold and of resistance to external factors, such as water or detergents.

The Applicant has discovered, surprisingly, that a nail varnish exhibiting a tangent delta damping power ( $\text{tg}\delta$ )  
15 of greater than or equal to 0.4 makes it possible to obtain:

- plasticization of the films without recourse to the addition of large amounts of external plasticizers, while maintaining a good level of hardness of the  
20 films, and
- good resistance of the varnishes on the nail to impacts and/or to flaking and thus an improvement in the hold over time of the varnishes on the nail and/or their wear resistance,
- 25 - while having a glossy composition film.

More specifically, a subject matter of the invention is a nail varnish composition comprising, in a cosmetically acceptable medium, at least one block  
30 polymer, said composition being capable of forming a film exhibiting a tangent delta damping power ( $\text{tg}\delta$ ) of greater than or equal to 0.4 at a temperature of 30°C and a frequency of 20 Hz.

35 The term "cosmetically acceptable medium" is understood to mean, within the meaning of the invention, a nontoxic medium capable of being applied to the skin,

superficial body growths or lips of the face of human beings.

Another subject matter of the invention is a cosmetic method for making up or for the nontherapeutic care of  
5 the nails comprising the application, to the nails, of at least one layer of the nail varnish composition as defined above.

A further subject matter of the invention is the use of  
10 a nail varnish composition comprising at least one block polymer, said composition being capable of forming a film exhibiting a tangent delta damping power ( $\text{tg}\delta$ ) of greater than or equal to 0.4 at a temperature of 30°C and a frequency of 20 Hz, in order to obtain a  
15 film, deposited on the nails, which is glossy, has good hold and is resistant to wear.

This block polymer can be formulated as sole film-forming polymer or in supplementing a conventional  
20 film-forming polymer, such as nitrocellulose or a nitrocellulose derivative, without having the disadvantage in the latter case of the addition of large amounts of plasticizers.

25 The composition according to the invention is capable of forming a film characterized by a specific viscoelastic behavior.

Generally, a material is said to be viscoelastic when,  
30 under the effect of shearing, it has both the characteristics of a purely elastic material, that is to say a material capable of storing energy, and the characteristics of a purely viscous material, that is to say a material capable of dissipating energy and  
35 with a response to stresses which depends on the time (noninstantaneous response).

More particularly, the film of the composition according to the invention can be characterized by its damping power  $\text{tg}\delta$ , which represents the ratio of the energy dissipated to the energy transmitted within the material.

The composition according to the invention is capable of forming a film having a damping power  $\text{tg}\delta$  of greater than or equal to 0.4, in particular ranging from 0.4 to 1.5, preferably of greater than or equal to 0.5, in particular ranging from 0.5 to 1.5, and better still of greater than or equal to 0.6, for example ranging from 0.6 to 1, at a temperature of 30°C and a frequency of 20 Hz. Furthermore, the composition according to the invention is preferably capable of forming a film having a storage modulus  $E'$  of greater than or equal to 1 MPa, in particular ranging from 1 MPa to 5000 MPa, preferably of greater than or equal to 5 MPa, in particular ranging from 5 to 1000 MPa, and better still of greater than or equal to 10 MPa, for example ranging from 10 to 500 MPa, at a temperature of 30°C and a frequency of 0.1 Hz.

#### Methods for measuring the characteristics of the film obtained with the composition

The damping power  $\text{tg}\delta$  is measured by DMTA (Dynamical and Mechanical Temperature Analysis). In order to measure the damping power  $\text{tg}\delta$  of the composition film, viscoelastometry tests are carried out with a TA Instruments Polymer DMTA device (DMA2980 model) on a sample of composition film. The sample is prepared by pouring the composition into a teflon-treated matrix and then drying for 24 hours on a plate thermostatically controlled at 30°C under conditions of ambient humidity (typically 50% RH  $\pm$  15%). A film is then obtained, from which the test specimens are cut out (for example with a hollow punch). The test

specimens typically have a thickness of approximately 200  $\mu\text{m}$ , a width of 5 to 10 mm and a working length of approximately 10 to 15 mm, after drying for 24 h.

- 5 The measurements are carried out at a constant temperature of 30°C.

The sample is stressed under tension and with small strains (for example, a sinusoidal displacement of  
10  $\pm 8 \mu\text{m}$  is imposed on it) during a frequency scan, the frequency ranging from 0.1 to 20 Hz. The operation is thus carried out in the linear region, under low levels of strain.

- 15 These measurements make it possible to determine the complex modulus  $E^* = E' + iE''$  of the composition film tested,  $E'$  being the storage modulus and  $E''$  being the "loss" modulus.

From these measurements, the damping power,  
20  $\text{tg}\delta = E''/E'$ , is also deduced.

#### Breaking strain

- Preferably, the composition according to the invention  
25 is capable of forming a film having a breaking strain  $\epsilon_b$  of greater than or equal to 5%, in particular ranging from 5 to 500%, preferably of greater than or equal to 15%, in particular ranging from 15 to 400%, and/or an energy at break per unit of volume  $W_b$  of greater than or  
30 equal to 0.2 J/cm<sup>3</sup>, in particular ranging from 0.2 to 100 J/cm<sup>3</sup>, preferably of greater than 1 J/cm<sup>3</sup>, in particular ranging from 1 to 50 J/cm<sup>3</sup>.

- The breaking strain and the energy at break per unit of  
35 volume are determined by tensile tests carried out on a composition film with a thickness of approximately 200  $\mu\text{m}$ . The film is obtained by pouring the composition over a teflon-treated matrix and then drying for 7 days

on a plate thermostatically controlled at 30°C under conditions of ambient humidity.

In order to carry out these tests, the film is cut into dumbbell test specimens with a working length of  
5 33 ± 1 mm and a working width of 6 mm. The cross section (C) of the test specimen is then defined as:  
C = width × thickness (cm<sup>2</sup>); this cross section will be used for the calculation of the stress.

10 The tests are carried out, for example, on a tensile testing device sold under the name Lloyd® LR5K. The measurements are carried out at ambient temperature (20°C).

15 The test specimens are drawn at a strain rate of 33 mm/min, corresponding to a rate of 100% elongation per minute.

A strain rate is thus imposed and the elongation ΔL of  
20 the test specimen and the force F necessary to bring about this elongation are measured simultaneously. It is from these data ΔL and F that the stress σ and strain ε parameters are determined.

25 A curve of stress σ = (F/C) as a function of the strain ε = (ΔL/L<sub>0</sub>) × 100, the test being carried out until the test specimen breaks, is thus obtained, L<sub>0</sub> being the initial length of the test specimen.

30 The breaking strain ε<sub>b</sub> is the maximum strain of the sample before the breaking point (in %).

The energy at break per unit of volume W<sub>b</sub> in J/cm<sup>3</sup> is defined as the area under this stress/strain curve such  
35 that:

$$W_b = \int_0^{\epsilon_b} \sigma \cdot \epsilon \cdot d\epsilon$$

Polymer

Advantageously, the block polymer of the composition according to the present invention comprises at least one first block and at least one second block which are incompatible with one another and which have different glass transition temperatures ( $T_g$ ), said first and second blocks being connected to one another via an intermediate segment comprising at least one constituent monomer of the first block and at least one constituent monomer of the second block, said polymer having a polydispersity index  $I$  of greater than 2.

"At least" one block is understood to mean one or more blocks.

The intermediate segment comprising at least one constituent monomer of the first block and at least one constituent monomer of the second block of the polymer makes it possible to "compatibilize" these blocks.

Specifically, the polymer according to the invention is a linear polymer. This means that the invention is not intended to cover polymers having a nonlinear structure, for example a branched, star, grafted or other structure.

Preferably, the polymer according to the invention is soluble and/or dispersible, at ambient temperature ( $25^{\circ}\text{C}$ ), at an active material content of at least 10% by weight, in at least one solvent (in particular organic solvent).

The polydispersity index  $I$  of the polymer is equal to the ratio of the weight-average molar mass  $M_w$  to the number-average molar mass  $M_n$ .



The weight-average molar mass ( $M_w$ ) and the number-average molar mass ( $M_n$ ) are determined by gel permeation liquid chromatography (solvent THF, calibration curve drawn up with linear polystyrene standards, refractometric detector).

The weight-average molar mass ( $M_w$ ) of the polymer according to the invention is preferably less than or equal to 150 000; it ranges, for example, from 35 000 to 150 000 and better still from 45 000 to 100 000.

The number-average molar mass ( $M_n$ ) of the polymer according to the invention is preferably less than or equal to 40 000; it ranges, for example, from 10 000 to 40 000 and better still from 12 000 to 25 000.

Preferably, the polydispersity index of the polymer according to the invention is greater than 2, preferably greater than or equal to 2.5, better still greater than or equal to 2.8 and in particular between 2.8 and 6.

Advantageously, the block polymer of the composition according to the invention is capable of forming alone a film exhibiting a tangent delta damping power ( $\text{tg}\delta$ ) of greater than or equal to 0.4 at a temperature of 30°C and a frequency of 20 Hz, the damping power of the polymer film being determined by the same method indicated above as for the composition film.

Preferably, the polymer has a  $T_g$ , measured by DMTA, ranging from 10°C to 80°C, better still from 10°C to 60°C and even better still from 20°C to 50°C.

Method for measuring the glass transition temperature  $T_g$  of the polymer

The glass transition temperature is measured by DMTA according to the method described above but with the following differences:

5 - the measurements are carried out on a sample of polymer film with a thickness of  $200 \pm 50 \mu\text{m}$ , a width of 5 to 10 mm and a length of 10 to 15 mm,

- the sample is stressed under tension and with small strains at a frequency of 1 Hz (for example, a sinusoidal strain of  $\pm 8 \mu\text{m}$  is imposed on it) during a temperature scan at  $3^\circ\text{C}/\text{min}$ . This tensile stress is produced on the sample at temperatures varying, for example, from  $-150^\circ\text{C}$  to  $+220^\circ\text{C}$ .

10 The complex modulus  $E^* = E' + iE''$  of the polymer tested is determined as a function of the temperature,  $E'$  being the storage modulus and  $E''$  being the "loss" modulus.

From these measurements, the damping power,  $\text{tg}\delta = E''/E'$ , is also deduced.

20 The curve of the values of  $\text{tg}\delta$  as a function of the temperature is then plotted. The glass transition temperature  $T_g$  of the polymer corresponds to the temperature for which a maximum value (corresponding to a peak) of  $\text{tg}\delta$  is obtained.

25 When the curve exhibits at least 2 peaks (in this case, the polymer exhibits at least 2 relaxations), the  $T_g$  value of the polymer tested is taken as being the temperature for which the curve exhibits the peak with the greatest amplitude (that is to say, corresponding to the highest value of  $\text{tg}\delta$ ; in this case, only the "majority"  $T_g$  is regarded as  $T_g$  value of the polymer tested).

35 Each block or sequence of the polymer according to the invention results from one type of monomer or from several types of monomers which are different.

This means that each block can be composed of a homopolymer or of a copolymer; it being possible for

this copolymer constituting the block to be in its turn random or alternating.

The intermediate segment comprising at least one constituent monomer of the first block and at least one  
5 constituent monomer of the second block of the polymer is itself a random polymer.

According to the invention, the first and second blocks have different glass transition temperatures.

10

The difference between the glass transition temperatures of the first and second blocks is greater than 20°C, preferably greater than 30°C and better still greater than 40°C; it is at most 80°C.

15

The first block advantageously has a Tg of greater than or equal to 40°C, for example a Tg ranging from 40°C to 200°C, preferably of greater than or equal to 50°C, for example ranging from 50°C to 150°C, and better still of  
20 greater than or equal to 60°C, for example from 60°C to 100°C.

Preferably, the proportion of the block with a Tg of greater than or equal to 40°C ranges from 20 to 90% by  
25 weight of the polymer, better still from 30 to 70% by weight of the polymer.

The second block advantageously has a Tg of less than or equal to 20°C, for example ranging from 20°C to  
30 -100°C, preferably of less than or equal to 10°C, in particular ranging from 10°C to -80°C and better still from 0°C to -50°C.

Preferably, the proportion of the block with a Tg of less than or equal to 20°C ranges from 5 to 75% by  
35 weight of the polymer, preferably from 30 to 70% by weight of the polymer.

The glass transition temperatures indicated for the first and second blocks are theoretical Tg values. They are determined from the theoretical Tg values of the constituent monomers of each of the blocks, which can  
5 be found in a reference handbook, such as the Polymer Handbook, 3rd ed., 1989, John Wiley, according to the following relationship:

$$1/T_g = \sum_i (\varpi_i / T_{g_i}) \text{ (Fox's Law) ,}$$

10  $\varpi_i$  being the fraction by weight of the monomer i and  $T_{g_i}$  being the glass transition temperature of the homopolymer of the monomer i.

The first block, which advantageously has a Tg of  
15 greater than or equal to 40°C, is a homopolymer or a copolymer and preferably results, in all or in part, from one or more monomers which are such that the homopolymers prepared from these monomers have glass transition temperatures of greater than or equal to  
20 40°C.

This first block can be a homopolymer composed of just one type of monomer (the Tg of the corresponding homopolymer of which is greater than or equal to 40°C).

25 The monomers for which the homopolymers have glass transition temperatures of greater than or equal to 40°C and from which result(s), preferably, the block or blocks with a Tg of greater than or equal to 40°C of  
30 the polymer of the invention are preferably chosen from the following monomers:

- methacrylates of formula  $\text{CH}_2=\text{C}(\text{CH}_3)-\text{COOR}_1$   
in which  $\text{R}_1$  represents a linear or branched alkyl  
35 group comprising from 2 to 4 carbon atoms, such as a methyl, ethyl, propyl or isobutyl group, it being possible for said alkyl group in addition to

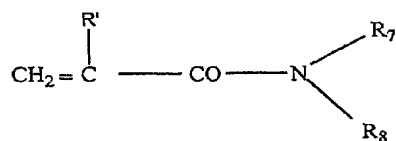
be optionally substituted by one or more substituents chosen from hydroxyl groups and halogen atoms (Cl, Br, I, F), or  $R_1$  represents a  $C_4$  to  $C_{12}$  cycloalkyl group,

5

- acrylates of formula  $CH_2=CH-COOR_2$  in which  $R_2$  represents a  $C_4$  to  $C_{12}$  cycloalkyl group, such as isobornyl acrylate, or a tert-butyl group,

10

- (meth)acrylamides of formula:



15

where  $R_7$  and  $R_8$ , which are identical or different, each represent a hydrogen atom or a linear or branched  $C_1$  to  $C_{12}$  alkyl group, such as an n-butyl, t-butyl, isopropyl, isohexyl, isooctyl or isononyl group, or  $R_7$  represents H and  $R_8$  represents a 1,1-dimethyl-3-oxobutyl group,

20

and  $R'$  denotes H or methyl. Mention may be made, as examples of monomers, of N-butylacrylamide, N-(t-butyl)acrylamide, N-isopropylacrylamide, N,N-dimethylacrylamide and N,N-dibutylacrylamide,

25

- styrene and its derivatives, such as chlorostyrene,

- and their mixtures.

30

The monomers which are particularly preferred for the first block are methyl methacrylate, isobutyl methacrylate, isobornyl (meth)acrylate, trifluoroethyl methacrylate, styrene and their mixtures.

35

The second block, which advantageously has a  $T_g$  of less than or equal to  $20^\circ C$ , is a homopolymer or a copolymer and in particular results, in all or in part, from one or more monomers which are such that the homopolymers

prepared from these monomers have glass transition temperatures of less than or equal to 20°C.

The monomers for which the homopolymers have Tg values of less than or equal to 20°C and from which result(s), preferably, the block or blocks with a Tg of less than or equal to 20°C of the polymer of the invention are preferably chosen from the following monomers:

- acrylates of formula  $\text{CH}_2=\text{CHCOOR}_3$ ,

10  $\text{R}_3$  representing a linear or branched  $\text{C}_1$  to  $\text{C}_{12}$  alkyl group with the exception of the tert-butyl group, in which occur(s), optionally intercalated, one or more heteroatoms chosen from O, N or S, it being possible for said alkyl group in addition to be  
15 optionally substituted by one or more substituents chosen from hydroxyl groups and halogen atoms (Cl, Br, I and F), or  $\text{R}_3$  representing a  $\text{C}_1$  to  $\text{C}_{12}$  alkyl-POE (polyoxyethylene) with repetition of the oxyethylene unit from 5 to 30 times, for example  
20 methoxy-POE, or  $\text{R}_3$  representing a polyoxyethylene group comprising from 5 to 30 ethylene oxide units;

- methacrylates of formula  $\text{CH}_2=\text{C}(\text{CH}_3)\text{-COOR}_4$ ,

25  $\text{R}_4$  representing a linear or branched  $\text{C}_4$  to  $\text{C}_{12}$  alkyl group in which occur(s), optionally intercalated, one or more heteroatoms chosen from O, N and S, it being possible for said alkyl group in addition to be optionally substituted by one or more  
30 substituents chosen from hydroxyl groups and halogen atoms (Cl, Br, I, F);

- vinyl esters of formula  $\text{R}_5\text{-CO-O-CH=CH}_2$

35 where  $\text{R}_5$  represents a linear or branched  $\text{C}_4$  to  $\text{C}_{12}$  alkyl group;

- alkyl vinyl ethers having a C<sub>4</sub> to C<sub>12</sub> alkyl group, such as vinyl methyl ether and vinyl ethyl ether;

5       - N-(C<sub>4</sub> to C<sub>12</sub> alkyl)acrylamides, such as N-octylacrylamide;

- and their mixtures.

10      The monomers which are particularly preferred for the second block are alkyl acrylates for which the alkyl chain comprises from 1 to 4 carbon atoms, with the exception of the tert-butyl group, in particular methyl acrylate.

15

Nevertheless, each of the blocks can comprise a minor proportion of at least one constituent monomer of the other block.

Thus, the first block can comprise at least one  
20      constituent monomer of the second block, and vice versa.

Each of the first and/or second blocks can comprise a constituent monomer of the other block in an amount generally of less than or equal to 20%, for example  
25      from 1 to 20%, preferably from 5 to 15% and better still from 7 to 12%, by weight of the total weight of the first and/or the second block.

The first block, which advantageously has a glass  
30      transition temperature of greater than or equal to 10°C, and/or the second block, advantageously having a glass transition temperature of less than or equal to 0°C, can comprise, in addition to the monomers indicated above, one or more other different monomers  
35      known as additional monomers.

The nature and the amount of this or these additional monomers are preferably chosen so that the block in

which they occur has the desired glass transition temperature.

This additional monomer is, for example, chosen from  
5 hydrophilic monomers, such as:

- monomers having ethylenic unsaturation(s) comprising at least one carboxylic or sulfonic acid functional group, such as, for example:

acrylic acid, methacrylic acid, crotonic acid, maleic  
10 anhydride, itaconic acid, fumaric acid, maleic acid, styrenesulfonic acid, acrylamidopropanesulfonic acid, vinylbenzoic acid, vinylphosphoric acid and the salts of these,

- monomers having ethylenic unsaturation(s) comprising  
15 at least one hydroxyl functional group, such as 2-hydroxypropyl methacrylate, 2-hydroxyethyl methacrylate, 2-hydroxypropyl acrylate and 2-hydroxyethyl acrylate,

- monomers having ethylenic unsaturation(s) comprising  
20 at least one tertiary amine functional group, such as 2-vinylpyridine, 4-vinylpyridine, dimethylaminoethyl methacrylate, diethylaminoethyl methacrylate, dimethylaminopropylmethacrylamide and the salts of these,

25 - and their mixtures.

This or these additional monomers generally represent(s) an amount of less than or equal to 30% by weight, for example from 1 to 30% by weight, preferably  
30 from 5 to 20% by weight and more preferably from 7 to 15% by weight, of the total weight of the first and/or second blocks.

The polymer according to the invention can be obtained  
35 by radical solution polymerization according to the following preparation process:

- a portion of the polymerization solvent is introduced into a suitable reactor and is heated



until the temperature appropriate for the polymerization (typically between 60 and 120°C) is reached,

- 5       - once this temperature has been reached, the constituent monomers of the first block are introduced in the presence of a portion of the polymerization initiator,
- 10       - at the end of a time T corresponding to a maximum degree of conversion of 90%, the constituent monomers of the second block and the other portion of the initiator are introduced,
- 15       - the mixture is allowed to react for a time T' (ranging from 3 to 6 h), at the end of which the mixture is brought back to ambient temperature,
- 15       - the polymer is obtained in solution in the polymerization solvent.

The term "polymerization solvent" is understood to mean a solvent or a mixture of solvents. The polymerization  
20 solvent can be chosen in particular from ethyl acetate, butyl acetate, alcohols, such as isopropanol or ethanol, and their mixtures. Preferably, the polymerization solvent is a mixture of butyl acetate and isopropanol.

25 The time T corresponds to a degree of conversion of 90%, that is to say to a percentage by weight of constituent monomers of the first block consumed of 90%.

30 The polymerization temperature preferably ranges from 60 to 120°C and more preferably from 80 to 100°C.

35 The polymerization initiator can be chosen from organic peroxides comprising from 8 to 30 carbon atoms; mention may be made, for example, of 2,5-bis(2-ethylhexanoylperoxy)-2,5-dimethylhexane, sold under the reference Trigonox® 141 by Akzo Nobel.

Generally, these compositions comprise from 0.1 to 60% by weight, preferably from 0.5 to 50% by weight and more preferably from 1 to 40% by weight of the block  
5 polymer according to the invention.

#### Solvent medium

The cosmetic composition can comprise an organic  
10 solvent medium or an aqueous medium and preferably an organic solvent medium comprising an organic solvent or a mixture of organic solvents.

The organic solvent can be chosen from:

- 15 - ketones which are liquid at ambient temperature, such as methyl ethyl ketone, methyl isobutyl ketone, diisobutyl ketone, isophorone, cyclohexanone or acetone;
- alcohols which are liquid at ambient temperature,  
20 such as ethanol, isopropanol, diacetone alcohol, 2-butoxyethanol or cyclohexanol;
- glycols which are liquid at ambient temperature, such as ethylene glycol, propylene glycol, pentylene glycol or glycerol;
- 25 - propylene glycol ethers which are liquid at ambient temperature, such as propylene glycol monomethyl ether, propylene glycol monomethyl ether acetate or dipropylene glycol mono(n-butyl) ether;
- cyclic ethers, such as  $\gamma$ -butyrolactone;
- 30 - short-chain esters (having from 3 to 8 carbon atoms in total), such as ethyl acetate, methyl acetate, propyl acetate, isopropyl acetate, n-butyl acetate, isopentyl acetate, methoxypropyl acetate or butyl lactate;
- 35 - ethers which are liquid at ambient temperature, such as diethyl ether, dimethyl ether or dichlorodiethyl ether;

- alkanes which are liquid at ambient temperature, such as decane, heptane, dodecane or cyclohexane;
- alkyl sulfoxides, such as dimethyl sulfoxide;
- aldehydes which are liquid at ambient temperature,
- 5 such as benzaldehyde or acetaldehyde;
- heterocyclic compounds, such as tetrahydrofuran;
- propylene carbonate or ethyl 3-ethoxypropionate;
- their mixtures.

10 Preferably, the organic solvent medium exhibits a polarity P ranging from 0.499 to 0.725.

The polarity is defined as a function of the solubility parameters according to the Hansen solubility space  
15 according to the following relationship:

$$P = \sqrt{(\delta p^2 + \delta h^2)}/\delta t$$

- $\delta h$  characterizing the forces of specific interactions (hydrogen bond, acid/base or donor/acceptor type, and the like);
- 20 -  $\delta p$  characterizing the Debye interaction forces between permanent dipoles and the Keesom interaction forces between induced dipoles and permanent dipoles;
- and  $\delta t = \sqrt{(\delta p^2 + \delta h^2 + \delta d^2)}$ ,  $\delta d$  characterizing the London dispersion forces resulting from the formation  
25 of dipoles induced during molecular impacts.

The definition and the calculation of the solubility parameters in the Hansen three-dimensional solubility space are described in the paper by C. M. Hansen: "The  
30 three-dimensional solubility parameters", J. Paint Technol., 39, 105 (1967).

When the solvent medium comprises a mixture of solvents, the polarity is determined from the  
35 solubility parameters of the mixture which are themselves determined from those of the compounds taken separately, according to the following relationships:

$$\delta d_{\text{mix}} = \sum_i x_i \cdot \delta d_i; \quad \delta p_{\text{mix}} = \sum_i x_i \cdot \delta p_i; \quad \delta h_{\text{mix}} = \sum_i x_i \cdot \delta h_i;$$

where  $x_i$  represents the fraction by volume of the compound  $i$  in the mixture.

5 Mention may in particular be made, as organic solvent having a polarity ranging from 0.499 to 0.725, of methyl acetate, isopropyl acetate, methoxypropyl acetate, butyl lactate, acetone, methyl ethyl ketone, a diacetone alcohol,  $\gamma$ -butyrolactone, tetrahydrofuran,  
10 propylene carbonate, ethyl 3-ethoxypropionate, dimethyl sulfoxide and their mixtures.

The organic solvent medium can represent from 10 to 95% by weight, with respect to the total weight of the  
15 composition, preferably from 15 to 80% by weight and better still from 20 to 60% by weight.

#### Additional film-forming polymer

20 The composition can comprise, in addition to the block polymer of the composition according to the invention, an additional polymer, such as a film-forming polymer. According to the present invention, the term "film-forming polymer" is understood to mean a polymer  
25 capable of forming, by itself alone or in the presence of an additional agent which is able to form a film, a continuous film which adheres to a support, in particular to keratinous substances.

Mention may be made, among film-forming polymers which  
30 can be used in the composition of the present invention, of synthetic polymers of radical type or of polycondensate type, polymers of natural origin and their mixtures.

35 The film-forming polymer can be chosen in particular from cellulose polymers, such as nitrocellulose, cellulose acetate, cellulose acetate butyrate,

cellulose acetate propionate or ethyl cellulose, or alternatively polyurethanes, acrylic polymers, vinyl polymers, polyvinyl butyrals, alkyd resins, resins resulting from aldehyde condensation products, such as  
5 arylsulfonamide-formaldehyde resins, for example toluenesulfonamide-formaldehyde resin, or arylsulfonamide-epoxy resins.

Use may in particular be made, as film-forming polymer,  
10 of nitrocellulose RS 1/8 sec.; RS ¼ sec.; RS ½ sec.; RS 5 sec.; RS 15 sec.; RS 35 sec.; RS 75 sec.; RS 150 sec.; AS ¼ sec.; AS ½ sec.; SS ¼ sec.; SS ½ sec.; SS 5 sec., sold in particular by Hercules; the toluenesulfonamide-formaldehyde resins "Ketjentflex  
15 MS80" from Akzo or "Santolite MHP" or "Santolite MS 80" from Faconnier or "Resimpol 80" from Pan Americana, the alkyd resin "Beckosol ODE 230-70-E" from Dainippon, the acrylic resin "Acryloid B66" from Röhm & Haas, or the polyurethane resin "Trixene PR 4127" from Baxenden.

20 The additional film-forming polymer can be present in the composition according to the invention in a content ranging from 0.1% to 60% by weight, with respect to the total weight of the composition, preferably ranging  
25 from 2% to 40% by weight and better still from 5% to 25% by weight.

#### Plasticizer

30 The composition can additionally comprise at least one plasticizing agent. Mention may in particular be made, alone or as a mixture, of conventional plasticizers, such as:

- glycols and their derivatives, such as diethylene glycol ethyl ether, diethylene glycol methyl ether,  
35 diethylene glycol butyl ether or diethylene glycol hexyl ether, ethylene glycol ethyl ether, ethylene glycol butyl ether or ethylene glycol hexyl ether;

- glycerol esters,
- propylene glycol derivatives and in particular propylene glycol phenyl ether, propylene glycol diacetate, dipropylene glycol butyl ether, tripropylene glycol butyl ether, propylene glycol methyl ether, dipropylene glycol ethyl ether, tripropylene glycol methyl ether and diethylene glycol methyl ether, or propylene glycol butyl ether,
- acid esters, in particular carboxylic acid esters, such as citrates, phthalates, adipates, carbonates, tartrates, phosphates or sebacates,
- oxyethylenated derivatives, such as oxyethylenated oils, in particular vegetable oils, such as castor oil;
- their mixtures.

15

The amount of plasticizer can be chosen by a person skilled in the art on the basis of his general knowledge, so as to obtain a composition having cosmetically acceptable properties. Preferably, the plasticizing agent is present in an amount of less than 20% by weight, preferably of less than 15% by weight, better still of less than 10% by weight and even better still of less than 5% by weight, with respect to the total weight of the composition.

Preferably, the composition according to the invention is devoid of plasticizing agent.

#### Coloring material

The composition according to the invention can additionally comprise one or more coloring materials chosen from water-soluble dyes and pulverulent coloring materials, such as pigments, pearlescent agents and glitter, well known to a person skilled in the art. The coloring materials can be present in the composition in a content ranging from 0.01% to 50% by weight, with respect to the weight of the composition, preferably from 0.01% to 30% by weight.

The term "pigments" should be understood as meaning white or colored and inorganic or organic particles of any shape which are insoluble in the physiological  
5 medium and which are intended to color the composition. The term "pearlescent agents" should be understood as meaning iridescent particles of any shape produced in particular by certain mollusks in their shells or else synthesized.

10

The pigments can be white or colored and inorganic and/or organic. Mention may be made, among inorganic pigments, of titanium dioxide, optionally surface-treated, zirconium or cerium oxides, and also zinc,  
15 iron (black, yellow or red) or chromium oxides, manganese violet, ultramarine blue, chromium hydrate and ferric blue, or metal powders, such as aluminum powder or copper powder.

Mention may be made, among organic pigments, of carbon  
20 black, pigments of D & C type, and lakes, based on cochineal carmine, of barium, strontium, calcium or aluminum.

The pearlescent pigments can be chosen from white pearlescent pigments, such as mica covered with  
25 titanium oxide or with bismuth oxychloride, colored pearlescent pigments, such as titanium oxide-coated mica covered with iron oxides, titanium oxide-coated mica covered with in particular ferric blue or chromium oxide, or titanium oxide-coated mica covered with an  
30 organic pigment of the abovementioned type, and pearlescent pigments based on bismuth oxychloride.

The water-soluble dyes are, for example, beetroot juice or methylene blue.

35 The composition according to the invention can additionally comprise one or more fillers, in particular in a content ranging from 0.01% to 50% by weight, with respect to the total weight of the

composition, preferably ranging from 0.01% to 30% by weight. The term "fillers" should be understood as meaning colorless or white and inorganic or synthetic particles of any shape which are insoluble in the medium of the composition, whatever the temperature at which the composition is manufactured. These fillers are used in particular to modify the rheology or the texture of the composition.

The fillers can be inorganic or organic fillers of any shape, platelet, spherical or oblong, whatever the crystallographic form (for example, sheet, cubic, hexagonal, orthorhombic, and the like). Mention may be made of talc, mica, silica, kaolin, polyamide (Nylon®) powders (Orgasol® from Atochem), poly- $\beta$ -alanine powders, polyethylene powders, powders formed of tetrafluoroethylene polymers (Teflon®), lauroyllysine, starch, boron nitride, polymeric hollow microspheres, such as those of polyvinylidene chloride/acrylonitrile, for example Expancel® (Nobel Industrie), or of acrylic acid copolymers (Polytrap® from Dow Corning), silicone resin microbeads (Tospearls® from Toshiba, for example), polyorganosiloxane elastomer particles, precipitated calcium carbonate, magnesium carbonate, basic magnesium carbonate, hydroxyapatite, hollow silica microspheres (Silica Beads® from Maprecos), glass or ceramic microcapsules, or metal soaps derived from organic carboxylic acids having from 8 to 22 carbon atoms, preferably from 12 to 18 carbon atoms, for example zinc stearate, magnesium stearate, lithium stearate, zinc laurate or magnesium myristate.

#### Other additives

The composition can additionally comprise other ingredients commonly used in cosmetic compositions. Such ingredients can be chosen from spreading agents, wetting agents, dispersing agents, antifoaming agents, preservatives, UV screening agents, active principles,



surfactants, moisturizing agents, fragrances, neutralizing agents, stabilizing agents or antioxidants.

5 Of course, a person skilled in the art will take care to choose this or these optional additional compounds and/or their amounts so that the advantageous properties of the composition according to the invention are not, or not substantially, detrimentally affected by the envisaged addition.

10

Of course, a person skilled in the art will take care to choose this or these optional additional compounds and/or their amounts so that the advantageous properties of the composition for the use according to the invention are not, or not substantially, detrimentally affected by the envisaged addition.

15

The examples which follow illustrate the invention without implied limitation.

20

In the examples which follow, the Tg values shown for the first and second blocks are theoretical Tg values calculated in the way defined above. The Tg value shown for the polymer is measured by DMTA.

25

**Example 1: Preparation of a poly(methyl methacrylate/acrylic acid/methyl acrylate) polymer**

100 g of butyl acetate are introduced into a 1 liter reactor and then the temperature is increased so as to change from ambient temperature (25°C) to 90°C in 1 hour.

30

180 g of methyl methacrylate, 30 g of acrylic acid, 40 g of butyl acetate, 70 g of isopropanol and 1.8 g of 2,5-bis(2-ethylhexanoylperoxy)-2,5-dimethylhexane (Trigonox® 141 from Akzo Nobel) are subsequently added at 90°C in 1 hour.

35

The mixture is maintained at 90°C for 1 hour.

90 g of methyl acrylate, 70 g of butyl acetate, 20 g of isopropanol and 1.2 g of 2,5-bis(2-ethylhexanoylperoxy)-2,5-dimethylhexane are subsequently introduced into the preceding mixture, still at 90°C and in 1 hour.

The mixture is maintained at 90°C for 3 hours and then diluted with 105 g of butyl acetate and 45 g of isopropanol; the combined product is then cooled. A 40% solution of polymer active material in the butyl acetate/isopropanol mixture is obtained.

A polymer is obtained comprising a first poly(methyl methacrylate/acrylic acid) block or sequence having a theoretical Tg of 100°C, a second polymethyl acrylate block or sequence having a theoretical Tg of 10°C and an intermediate block which is a methyl methacrylate/acrylic acid/polymethyl acrylate random polymer.

This polymer exhibits a weight-average molar mass of 52 000 and a number-average molar mass of 18 000, i.e. a polydispersity index I of 2.89.

It has a glass transition temperature (Tg), measured by DMTA, of 63°C.

It exhibits a storage modulus E' equal to 90 MPa, at 30°C and 0.1 Hz, and a tgδ value of 0.33, at 30°C and 20 Hz.

**Example 2: Preparation of a poly(methyl methacrylate/acrylic acid/methyl acrylate) polymer**

100 g of butyl acetate are introduced into a 1 liter reactor and then the temperature is increased so as to change from ambient temperature (25°C) to 90°C in 1 hour.

150 g of methyl methacrylate, 30 g of acrylic acid, 30 g of methyl acrylate, 40 g of butyl acetate, 70 g of

isopropanol and 1.8 g of 2,5-bis(2-ethylhexanoyl-peroxy)-2,5-dimethylhexane (Trigonox<sup>®</sup> 141 from Akzo Nobel) are subsequently added at 90°C in 1 hour.

The mixture is maintained at 90°C for 1 hour.

5 90 g of methyl acrylate, 70 g of butyl acetate, 20 g of isopropanol and 1.2 g of 2,5-bis(2-ethylhexanoylperoxy)-2,5-dimethylhexane are subsequently introduced into the preceding mixture, still at 90°C and in 1 hour.

10 The mixture is maintained at 90°C for 3 hours and then diluted with 105 g of butyl acetate and 45 g of isopropanol; the combined product is then cooled.

A 40% solution of polymer active material in the butyl acetate/isopropanol mixture is obtained.

15

A polymer is obtained comprising a first poly(methyl methacrylate/acrylic acid/methyl acrylate) block or sequence having a Tg of 80°C, a second polymethyl acrylate block having a Tg of 10°C and an intermediate  
20 block which is an acrylic acid/methyl methacrylate/polymethyl acrylate random polymer.

This polymer exhibits a weight-average molar mass of 50 000 and a number-average molar mass of 17 000, i.e.  
25 a polydispersity index I of 2.95.

It has a glass transition temperature (Tg) of 49°C.

It exhibits a storage modulus E' equal to 12 MPa, at 30°C and 0.1 Hz, and a Tg $\delta$  value of 0.54, at 30°C and  
30 20 Hz.

**Example 3: Preparation of a poly(acrylic acid/methyl acrylate/methyl acrylate/trifluoroethyl methacrylate) polymer**

35

100 g of butyl acetate are introduced into a 1 liter reactor and then the temperature is increased so as to

change from ambient temperature (25°C) to 90°C in 1 hour.

120 g of methyl methacrylate, 30 g of acrylic acid, 60 g of trifluoroethyl methacrylate, 40 g of butyl acetate, 70 g of isopropanol and 1.8 g of 2,5-bis(2-ethylhexanoylperoxy)-2,5-dimethylhexane (Trigonox® 141 from Akzo Nobel) are subsequently added at 90°C in 1 hour.

The mixture is maintained at 90°C for 1 hour.

90 g of methyl acrylate, 70 g of butyl acetate, 20 g of isopropanol and 1.2 g of 2,5-bis(2-ethylhexanoylperoxy)-2,5-dimethylhexane are subsequently introduced into the preceding mixture, still at 90°C and in 1 hour.

The mixture is maintained at 90°C for 3 hours and then diluted with 105 g of butyl acetate and 45 g of isopropanol; the combined product is then cooled.

A 40% solution of polymer active material in the butyl acetate/isopropanol mixture is obtained.

20

A polymer is obtained comprising a first poly(acrylic acid/methyl methacrylate/trifluoroethyl methacrylate) block or sequence having a Tg of 85°C, a second polymethyl acrylate block having a Tg of 10°C and an intermediate block which is an acrylic acid/methyl acrylate/polymethyl acrylate/trifluoroethyl methacrylate random polymer.

This polymer exhibits a weight-average molar mass of 53 000 and a number-average molar mass of 17 500, i.e. a polydispersity index I of 3.03.

It has a glass transition temperature (Tg) of 58°C.

It exhibits a storage modulus E' equal to 3 MPa, at 30°C and 0.1 Hz, and a Tgδ value of 0.34, at 30°C and 20 Hz.

#### **Example 4: Nail varnish**

A nail varnish was prepared which has the following composition:

5	Polymer of example 1	23.8 g as AM
	Butyl acetate	24.99 g
	Isopropanol	10.71 g
	Hexylene glycol	2.5 g
	DC Red 7 lake	1 g
10	Hectorite modified with	1.3 g
	stearyldimethylbenzylammonium chloride	
	(Bentone® 27V from Elementis)	

After application to the nails, the varnish film was  
15 judged to exhibit very good properties of hold and of  
impact strength.

WHAT IS CLAIMED IS:

1. A nail varnish composition comprising, in a cosmetically acceptable medium, at least one block polymer, said composition being capable of forming a film exhibiting a tangent delta damping power ( $\text{tg}\delta$ ) of greater than or equal to 0.4 at a temperature of 30°C and a frequency of 20 Hz.
2. The composition as claimed in the preceding claim, the composition film exhibiting a tangent delta damping power  $\text{tg}\delta$  of greater than or equal to 0.5 at a temperature of 30°C and a frequency of 20 Hz.
3. The composition as claimed in either of the preceding claims, the composition film exhibiting a storage modulus  $E'$  of greater than or equal to 1 MPa, preferably of greater than or equal to 5 MPa and better still of greater than or equal to 10 MPa at a temperature of 30°C and a frequency of 0.1 Hz.
4. The composition as claimed in one of the preceding claims, which is capable of forming a film having a breaking strain  $\epsilon_b$  of greater than or equal to 5%, in particular ranging from 5 to 500%, preferably of greater than or equal to 15%, in particular ranging from 15 to 400%, and/or an energy at break per unit of volume  $W_b$  of greater than or equal to 0.2 J/cm<sup>3</sup> at a temperature of 20°C.
5. The composition as claimed in one of the preceding claims, wherein the block polymer has a glass transition temperature ( $T_g$ ) ranging from 10°C to 80°C.

6. The composition as claimed in one of the preceding claims, wherein the block polymer has a weight-average molar mass ( $M_w$ ) of less than or equal to 150 000.
- 5
7. The composition as claimed in one of the preceding claims, wherein the block polymer has a number-average molar mass ( $M_n$ ) of less than or equal to 40 000.
- 10
8. The composition as claimed in one of the preceding claims, wherein the block polymer comprises at least one first block and at least one second block which are incompatible with one another and which have different glass transition temperatures ( $T_g$ ), said first and second blocks being connected to one another via an intermediate segment comprising at least one constituent monomer of the first block and at least one constituent monomer of the second block and said polymer having a polydispersity index  $I$  of greater than 2.
- 15
- 20
9. The composition as claimed in the preceding claim, wherein the difference between the glass transition temperatures ( $T_g$ ) of the first and second blocks of the block polymer is greater than 20°C, preferably greater than 30°C and better still greater than 40°C.
- 25
- 30
10. The composition as claimed in claim 8 or 9, wherein the first block has a  $T_g$  of greater than or equal to 40°C.
- 35
11. The composition as claimed in claim 10, wherein the proportion of the block having a  $T_g$  of greater than or equal to 40°C ranges from 20 to 90% by weight of the polymer, better still from 30 to 70% by weight of the polymer.

12. The composition as claimed in claim 10 or 11, wherein the block with a Tg of greater than or equal to 40°C results, in all or in part, from one or more monomers which are such that the homopolymers prepared from these monomers have glass transition temperatures of greater than or equal to 40°C.

13. The composition as claimed in claim 12, wherein the monomers for which the homopolymers have glass transition temperatures of greater than or equal to 40°C are chosen from the following monomers:

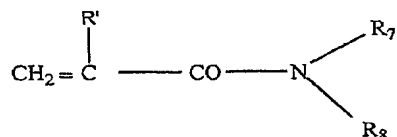
- methacrylates of formula  $\text{CH}_2=\text{C}(\text{CH}_3)-\text{COOR}_1$

in which  $\text{R}_1$  represents a linear or branched alkyl group comprising from 1 to 4 carbon atoms, such as a methyl, ethyl, propyl or isobutyl group, it being possible for said alkyl group in addition to be optionally substituted by one or more substituents chosen from hydroxyl groups and halogen atoms (Cl, Br, I, F), or  $\text{R}_1$  represents a  $\text{C}_4$  to  $\text{C}_{12}$  cycloalkyl group,

- acrylates of formula  $\text{CH}_2=\text{CH}-\text{COOR}_2$

in which  $\text{R}_2$  represents a  $\text{C}_4$  to  $\text{C}_{12}$  cycloalkyl group, such as isobornyl acrylate, or a tert-butyl group,

- (meth)acrylamides of formula:



where  $\text{R}_7$  and  $\text{R}_8$ , which are identical or different, each represent a hydrogen atom or a linear or branched alkyl group of 1 to 12 carbon atoms, such as an n-butyl, t-butyl, isopropyl, isohexyl, isooctyl or isononyl group, or  $\text{R}_7$  represents H and  $\text{R}_8$  represents a 1,1-dimethyl-3-oxobutyl group, and  $\text{R}'$  denotes H or methyl,

- styrene and its derivatives, such as chlorostyrene,



- and their mixtures.

14. The composition as claimed in claim 12 or 13,  
wherein the monomers for which the homopolymers  
5 have glass transition temperatures of greater than  
or equal to 40°C are chosen from methyl  
methacrylate, isobutyl methacrylate, isobornyl  
(meth)acrylate, trifluoroethyl methacrylate,  
styrene and their mixtures.
- 10 15. The composition as claimed in claim 8 or 9,  
wherein the second block has a Tg of less than or  
equal to 20°C.
- 15 16. The composition as claimed in the preceding claim,  
wherein the proportion of the block having a glass  
transition temperature of less than or equal to  
20°C ranges from 5 to 75% by weight of the  
polymer, preferably from 30 to 70% by weight of  
20 the polymer.
17. The composition as claimed in claim 15 or 16,  
wherein the block with a Tg of less than or equal  
to 20°C results, in all or in part, from one or  
25 more monomers which are such that the homopolymers  
prepared from these monomers have glass transition  
temperatures of less than or equal to 20°C.
18. The composition as claimed in claim 17, wherein  
30 the monomers for which the homopolymers have glass  
transition temperatures of less than or equal to  
20°C are chosen from the following monomers:  
- acrylates of formula  $\text{CH}_2=\text{CHCOOR}_3$ ,  
R<sub>3</sub> representing a linear or branched C<sub>1</sub> to C<sub>12</sub> alkyl  
35 group with the exception of the tert-butyl group,  
in which occur(s), optionally intercalated, one or  
more heteroatoms chosen from O, N or S, it being  
possible for said alkyl group in addition to be

optionally substituted by one or more substituents chosen from hydroxyl groups and halogen atoms (Cl, Br, I and F), or  $R_3$  representing a  $C_1$  to  $C_{12}$  alkyl-POE (polyoxyethylene) with repetition of the oxyethylene unit from 5 to 30 times, for example methoxy-POE, or  $R_3$  representing a polyoxyethylene group comprising from 5 to 30 ethylene oxide units;

- methacrylates of formula  $CH_2=C(CH_3)-COOR_4$ ,  $R_4$  representing a linear or branched  $C_4$  to  $C_{12}$  alkyl group in which occur(s), optionally intercalated, one or more heteroatoms chosen from O, N and S, it being possible for said alkyl group in addition to be optionally substituted by one or more substituents chosen from hydroxyl groups and halogen atoms (Cl, Br, I, F);

- vinyl esters of formula  $R_5-CO-O-CH=CH_2$  where  $R_5$  represents a linear or branched  $C_4$  to  $C_{12}$  alkyl group;

- alkyl vinyl ethers having a  $C_4$  to  $C_{12}$  alkyl group, such as vinyl methyl ether and vinyl ethyl ether;

- N-( $C_4$  to  $C_{12}$  alkyl)acrylamides, such as N-octylacrylamide;

- and their mixtures.

19. The composition as claimed in claim 17 or 18, wherein the monomers for which the homopolymers have glass transition temperatures of less than or equal to  $20^\circ C$  are chosen from alkyl acrylates for which the alkyl chain comprises from 1 to 4 carbon atoms, with the exception of the tert-butyl group.

20. The composition as claimed in one of claims 8 to 19, wherein the first block and/or the second block of the polymer comprises at least one additional monomer.

21. The composition as claimed in the preceding claim,  
wherein the additional monomer is chosen from  
hydrophilic monomers, monomers having ethylenic  
unsaturation comprising one or more silicon atoms,  
5 and their mixtures.
22. The composition as claimed in claim 20 or 21,  
wherein the additional monomer is chosen from:
- 10 - monomers having ethylenic unsaturation(s)  
comprising at least one carboxylic or  
sulfonic acid functional group,
  - monomers having ethylenic unsaturation(s)  
comprising at least one hydroxyl functional  
group,
  - 15 - monomers having ethylenic unsaturation(s)  
comprising at least one tertiary amine  
functional group,
  - and their mixtures.
- 20 23. The composition as claimed in one of claims 20 to  
22, wherein the additional monomer or monomers  
represent(s) from 1 to 30% by weight of the total  
weight of the first and/or second blocks.
- 25 24. The composition as claimed in one of the preceding  
claims, wherein the block polymer is present in a  
content ranging from 0.1 to 60% by weight,  
preferably from 0.5 to 50% by weight and more  
preferably from 1 to 40% by weight, with respect  
30 to the total weight of the composition.
25. The composition as claimed in one of the preceding  
claims, which comprises an organic solvent medium.
- 35 26. The composition as claimed in the preceding claim,  
wherein the organic solvent medium comprises an  
organic solvent chosen from:

- ketones which are liquid at ambient temperature, such as methyl ethyl ketone, methyl isobutyl ketone, diisobutyl ketone, isophorone, cyclohexanone or acetone;
  - 5 - alcohols which are liquid at ambient temperature, such as ethanol, isopropanol, diacetone alcohol, 2-butoxyethanol or cyclohexanol;
  - glycols which are liquid at ambient temperature, such as ethylene glycol, propylene glycol, 10 pentylene glycol or glycerol;
  - propylene glycol ethers which are liquid at ambient temperature, such as propylene glycol monomethyl ether, propylene glycol monomethyl 15 ether acetate or dipropylene glycol mono(n-butyl) ether;
  - cyclic ethers, such as  $\gamma$ -butyrolactone;
  - short-chain esters (having from 3 to 8 carbon atoms in total), such as ethyl acetate, methyl 20 acetate, propyl acetate, isopropyl acetate, n-butyl acetate, isopentyl acetate, methoxypropyl acetate or butyl lactate;
  - ethers which are liquid at ambient temperature, such as diethyl ether, dimethyl ether or 25 dichlorodiethyl ether;
  - alkanes which are liquid at ambient temperature, such as decane, heptane, dodecane or cyclohexane;
  - alkyl sulfoxides, such as dimethyl sulfoxide;
  - aldehydes which are liquid at ambient 30 temperature, such as benzaldehyde or acetaldehyde;
  - heterocyclic compounds, such as tetrahydrofuran;
  - propylene carbonate or ethyl 3-ethoxypropionate;
  - their mixtures.
- 35 27. The composition as claimed in either of claims 25 and 26, wherein the organic solvent medium exhibits a polarity P ranging from 0.499 to 0.725.

28. The composition as claimed in one of claims 25 to 27, wherein the organic solvent medium represents from 10 to 95% by weight, with respect to the total weight of the composition, preferably from 15 to 80% by weight and better still from 20 to 60% by weight.
29. The composition as claimed in one of the preceding claims, which comprises an additional film-forming polymer.
30. The composition as claimed in the preceding claim, wherein the film-forming polymer is present in a content ranging from 0.1% to 60% by weight, with respect to the total weight of the composition, preferably ranging from 2% to 40% by weight and better still from 5% to 25% by weight.
31. The composition as claimed in one of the preceding claims, which comprises a plasticizing agent in an amount of less than 20% by weight, preferably of less than 15% by weight, better still of less than 10% by weight and even better still of less than 5% by weight, with respect to the total weight of the composition.
32. The composition as claimed in one of the preceding claims, which comprises a coloring material.
33. The composition as claimed in the preceding claim, wherein the coloring material is present in a content ranging from 0.01% to 50% by weight, with respect to the weight of the composition, preferably from 0.01% to 30% by weight.
34. A cosmetic method for making up or for the nontherapeutic care of the nails comprising the application, to the nails, of at least one layer

of a nail varnish composition as claimed in one of claims 1 to 33.

- 5           35. The use of a nail varnish composition comprising  
at least one block polymer, said composition being  
capable of forming a film exhibiting a tangent  
delta damping power ( $\text{tg}\delta$ ) of greater than or equal  
to 0.4 at a temperature of 30°C and a frequency of  
20 Hz, in order to obtain a film, deposited on the  
10       nails, which is glossy, has good hold and is  
resistant to wear.